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Claims

[c1] 1. An apparatus for attaching a proximity probe offset to an axis defining an extension cable comprising:
a sensing element;
a cylindrical part molded with a moldable material;
a recess configured in one of two opposing ends defining said cylindrical part to receive said sensing element;
a first and a second ferrule each extending from opposing surfaces defining an exterior of said cylindrical part,
a first axis defining said first and second ferrules being offset from a second axis defining said cylindrical part; and
an extension cable operably attached to said sensing element via said first and second ferrules, said sensing element being disposed offset relative to said extension cable.

[c2] 2. The apparatus of claim 1 wherein said first and second ferrules are linearly spaced apart along said first axis.

[c3] 3. The apparatus of claim 2 wherein said first and second ferrules are placed on a pin support within a mold, said moldable material is one of injection molded and

transfer molded around said first and second ferrules thereby forming a component alignment perform.

[c4] 4. The apparatus of claim 3 wherein said component alignment perform is molded as a cylinder, said cylinder being machined to include an annular recess and opposing cavities substantially perpendicular to said recess for respective said first and second ferrules.

[c5] 5. The apparatus of claim 3 wherein said component alignment perform is formed in a first injection molding process where said moldable material includes one of PolyPhenylene Sulfide (PPS) and PolyEthylEther Keytone (PEEK).

[c6] 6. The apparatus of claim 4 wherein said moldable material includes a material capable of rigorous chemical and temperature extremes.

[c7] 7. The apparatus of claim 1 wherein said offset includes a 90°angle.

[c8] 8. The apparatus of claim 1 wherein said cylindrical molded part is molded having a diameter of about 0.231 inch.

[c9] 9. The apparatus of 1 wherein said sensing element is disposed within said recess, a first lead of said sensing

element is resistance welded to said first ferrule, a second lead of said sensing element is resistance welded to said second ferrule, a center conductor of the extension cable is inserted into said first ferrule from said second ferrule, a coaxial conductor of the extension cable is inserted into said second ferrule, and the extension cable is electrically and mechanically connected with respective ferrules using an automated solder application and melting process.

[c10] 10. The apparatus of claim 9 wherein an inductive heating is used to cause at least one of a solder pellet, solder paste, and a solder ring to melt and flow over exposed conductors of the extension cable, and said exposed conductors are allowed to cool to electrically and mechanically secure bores defining each of said first and second ferrules with a respective said exposed conductors.

[c11] 11. The apparatus of claim 9 wherein respective bores are configured transverse to first and second cylinders defining corresponding apertures for each of said first and second ferrules, said bores generally extending tangential to an exterior circumferential surface defining said cylindrical part to allow access to each respective said first and second ferrules for said resistance welding the first and second leads with a corresponding ferrule

of said first and second ferrules.

[c12] 12. The apparatus of claim 1 wherein said first and second ferrules are formed from brass.

[c13] 13. The apparatus of claim 1 wherein said moldable material includes an electrical insulating material which has a characteristic of bonding to itself.

[c14] 14. A method for attaching a proximity probe offset to an axis defining an extension cable comprising:
disposing a first and a second ferrule in a molded cylindrical part, said first and second ferrules defining a first axis;
disposing a sensing element in a recess configured in said molded cylindrical part, said first axis being offset from a second axis defining said cylindrical part;
attaching leads from said sensing element to respective said first and second ferrules; and
attaching an extension cable to respective said first and second ferrules, thereby operatively connecting said sensing element with said extension cable.

[c15] 15. The method of claim 14 further comprising:
linearly spacing apart said first and second ferrules along said first axis; and
injection molding said cylindrical part.

[c16] 16. The method of claim 15 further comprising:
disposing said first and second ferrules on a pin support within a mold,
molding around said first and second ferrules with a moldable material thereby forming a component alignment perform.

[c17] 17. The method of claim 16 wherein said component alignment perform is formed in a first injection molding process where said moldable material includes one of PolyPhenylene Sulfide (PPS) and PolyEthylEther Keytone (PEEK).

[c18] 18. The method of claim 16 further comprising:
molding said component alignment perform as a cylinder; and
machining said cylinder to include an annular recess and opposing cavities substantially perpendicular to said recess for respective said first and second ferrules.

[c19] 19. The method of claim 14 wherein said recess includes said sensing element offset relative to the extension cable extending from said first and second ferrules.

[c20] 20. The method of claim 14 wherein said offset includes a 90°angle.

[c21] 21. The method of claim 14 wherein said molding a cylindrical molded part includes a diameter of about 0.231 inch.

[c22] 22. The method of claim 14 further comprising:
resistance welding a first lead of said sensing element to said first ferrule;
resistance welding a second lead of said sensing element to said second ferrule;
inserting a center conductor of the extension cable into said first ferrule from said second ferrule;
inserting a coaxial conductor of the extension cable into said second ferrule; and
connecting electrically and mechanically the extension cable with respective ferrules using an automated solder application and melting process.

[c23] 23. The method of claim 22 further comprising:
using inductive heating to cause at least one of a solder paste, pellet and a solder ring to melt and flow over exposed conductors of the extension cable; and
cooling said exposed conductors to electrically and mechanically secure bores defining each of said first and second ferrules with a respective said exposed conductors.

[c24] 24. The method of claim 22 further comprising:

configuring respective bores transverse to said first and second ferrules, said bores generally extending tangential to an exterior circumferential surface defining said cylindrical part to allow access to each respective said first and second ferrules for said resistance welding the extension cable with a corresponding ferrule of said first and second ferrules.

[c25] 25. The method of claim 14 wherein said first and second ferrules are formed from brass.

[c26] 26. The method of claim 14 wherein said moldable material includes an electrical insulating material which has a characteristic of bonding to itself.

[c27] 27. The method of claim 14 further comprising:
attaching a first lead of said sensing element to said first ferrule by one of crimping and contact heating therebetween;
attaching a second lead of said sensing element to said second ferrule by one of crimping and contact heating therebetween;
inserting a center conductor of the extension cable into said first ferrule from said second ferrule;
inserting a coaxial conductor of the extension cable into said second ferrule; and
connecting electrically and mechanically the extension

cable with respective ferrules using an automated solder application and melting process.

[c28] 28. A method for making a proximity probe offset to an axis defining an extension cable comprising:
molding a cylindrical part with a moldable material;
configuring a recess at one of two opposing ends defining said cylindrical part to receive a sensing element; and
configuring said cylindrical part having a first and second cylinder containing a first and second ferrule extending from opposing cylindrical surfaces defining an exterior of said cylindrical part, a first axis defining said first and second cylinders being offset from a second axis defining said cylindrical part.